



Third session of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM-III)

Marrakech, Morocco, 4-11 November 2009

Socio-economic Benefits of Met-ocean Information and Services in Africa

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Background for Africa

African countries are among the most vulnerable to extreme events and climate change, because of many factors:

- High **poverty** levels
 - Poor economic and social **infrastructure**
 - Heavy reliance on **climate-sensitive sectors** (e.g. rain-fed agriculture, fisheries, forests, tourism, etc.)
 - Existing **stresses** on health and well being
 - **Conflicts**
 - Low **adaptive capacity** (limited human, institutional, technological and financial capacities)
-



Background for Africa

Africa is already facing impacts of Climate change, which will worsen with time, if decisive actions are not taken now:

- Constrained agricultural production and increasing **food insecurity**
- Increasing **water stress** and related water conflicts
- Increasing **energy constraints**, further impeding industrial development
- Expanding range and prevalence of vector-borne **diseases**
- Rising sea level impacting **livelihoods in coastal areas**
- Loss of **biodiversity**, forests and other natural habitats
- Increased risks of **conflicts** arising from climate-induced population migrations

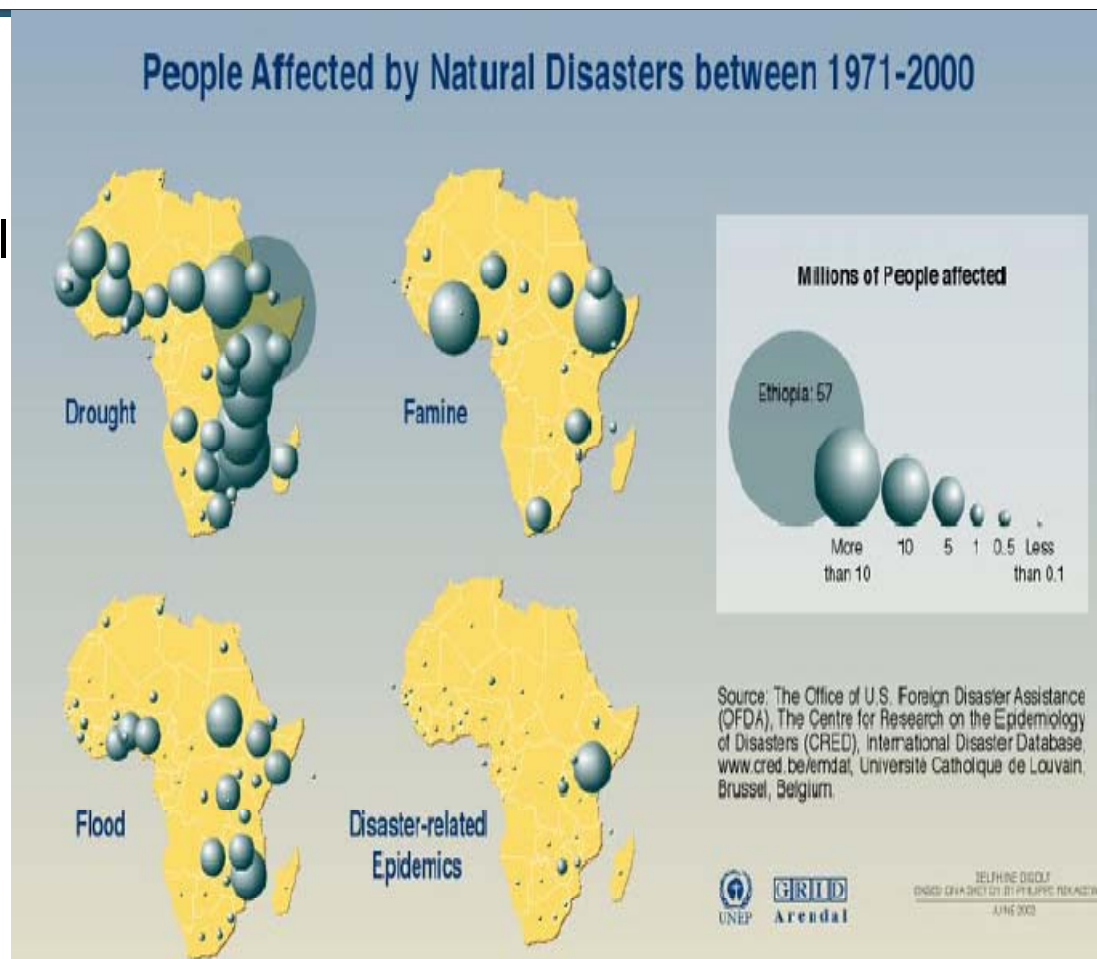


Background for Africa

In the period 1975-2002

Disasters of **hydrometeorological** origin constituted **59%** of the total natural disasters in sub-Saharan Africa with:

- 27% floods
- 21% drought
- 9% windstorms (particularly tropical cyclones)
- 1% wildfire

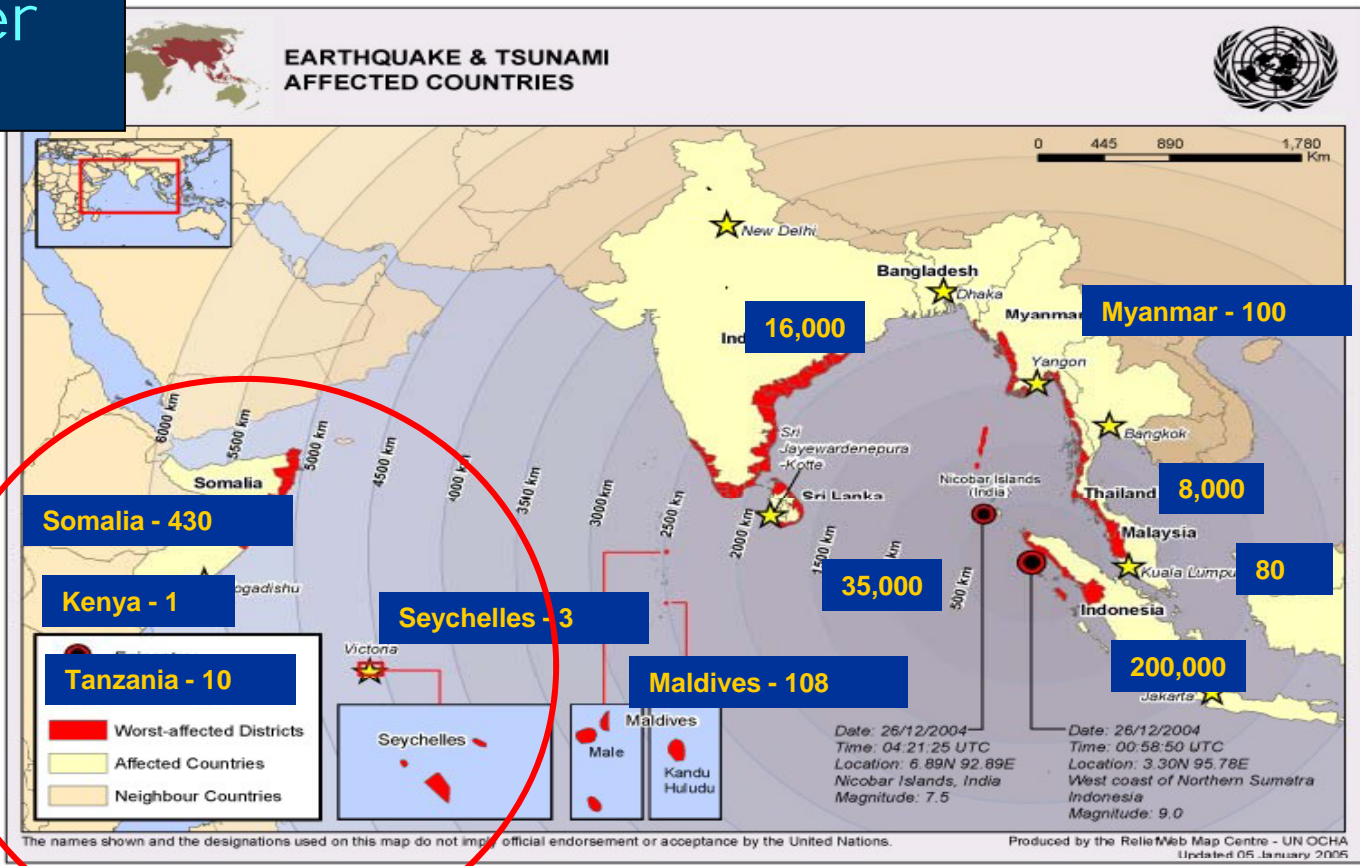


Source: UNEP GRID Arendal <http://www.grida.no/>



26 December
2004

11 countries
~250,000 deaths
1 million displaced





**“We cannot stop natural calamities,
but we can and must
better equip individuals and communities
to withstand them.”**

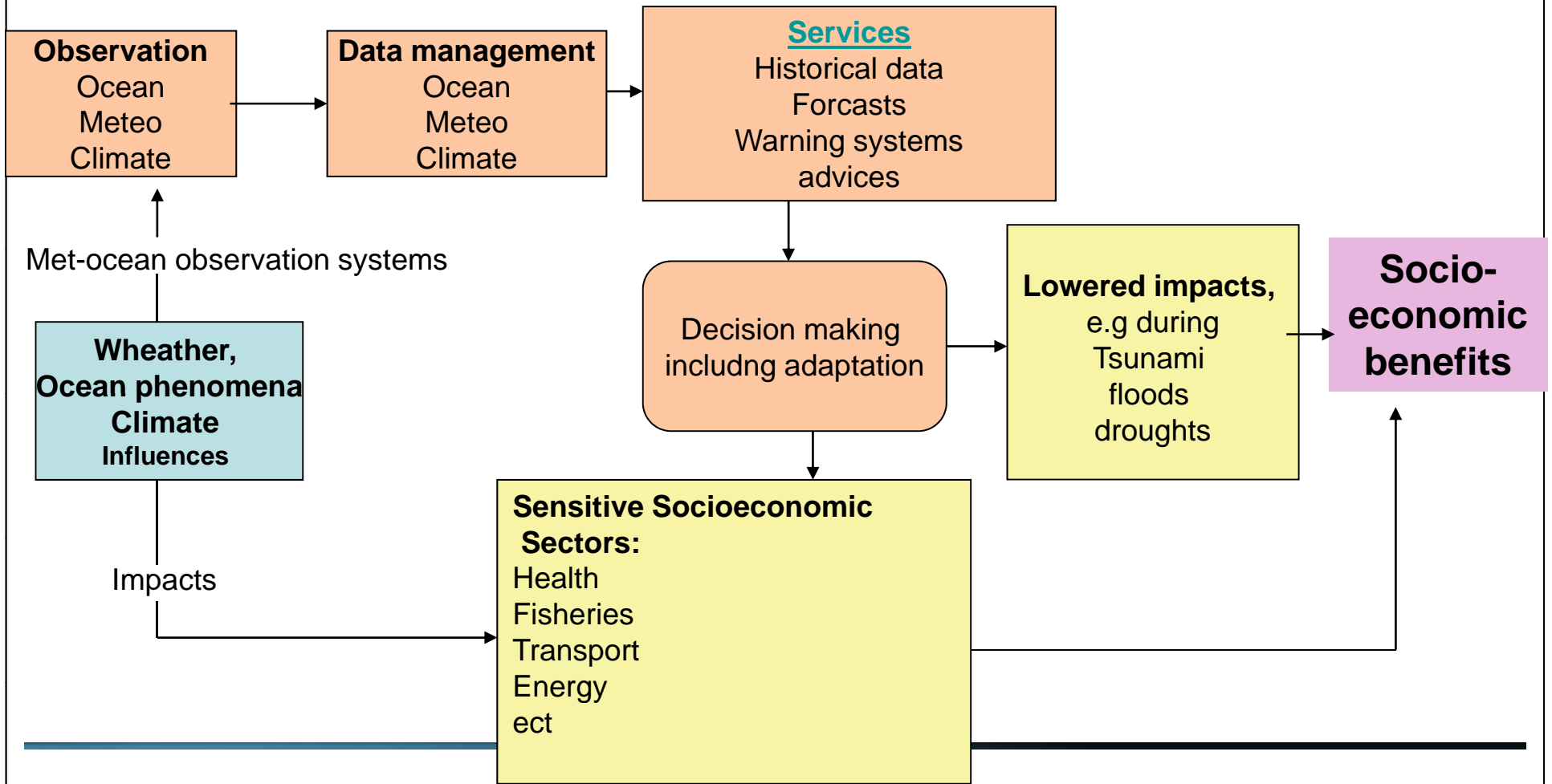


UN Secretary-General Kofi Annan



What is needed for Africa ?

- Developing the observational capacities of National Meteorological and Hydrological and Oceanographic Services;
 - Monitor and research extreme meteorological and hydrological events;
 - Improved weather forecasts, Climate system monitoring, Climate change detection and attribution;
 - Improved early warnings of imminent natural hazards and climate predictions;
 - Applications and services for sustainable economic development;
 - Assessment of the impacts of, and vulnerability and adaptation to, natural climate variability and human-induced climate change.
-





Services



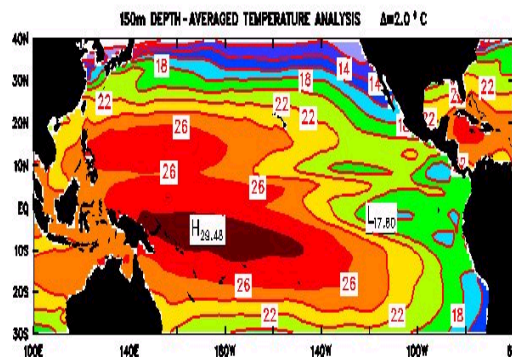
Risks Flood & Fire



Pollution response



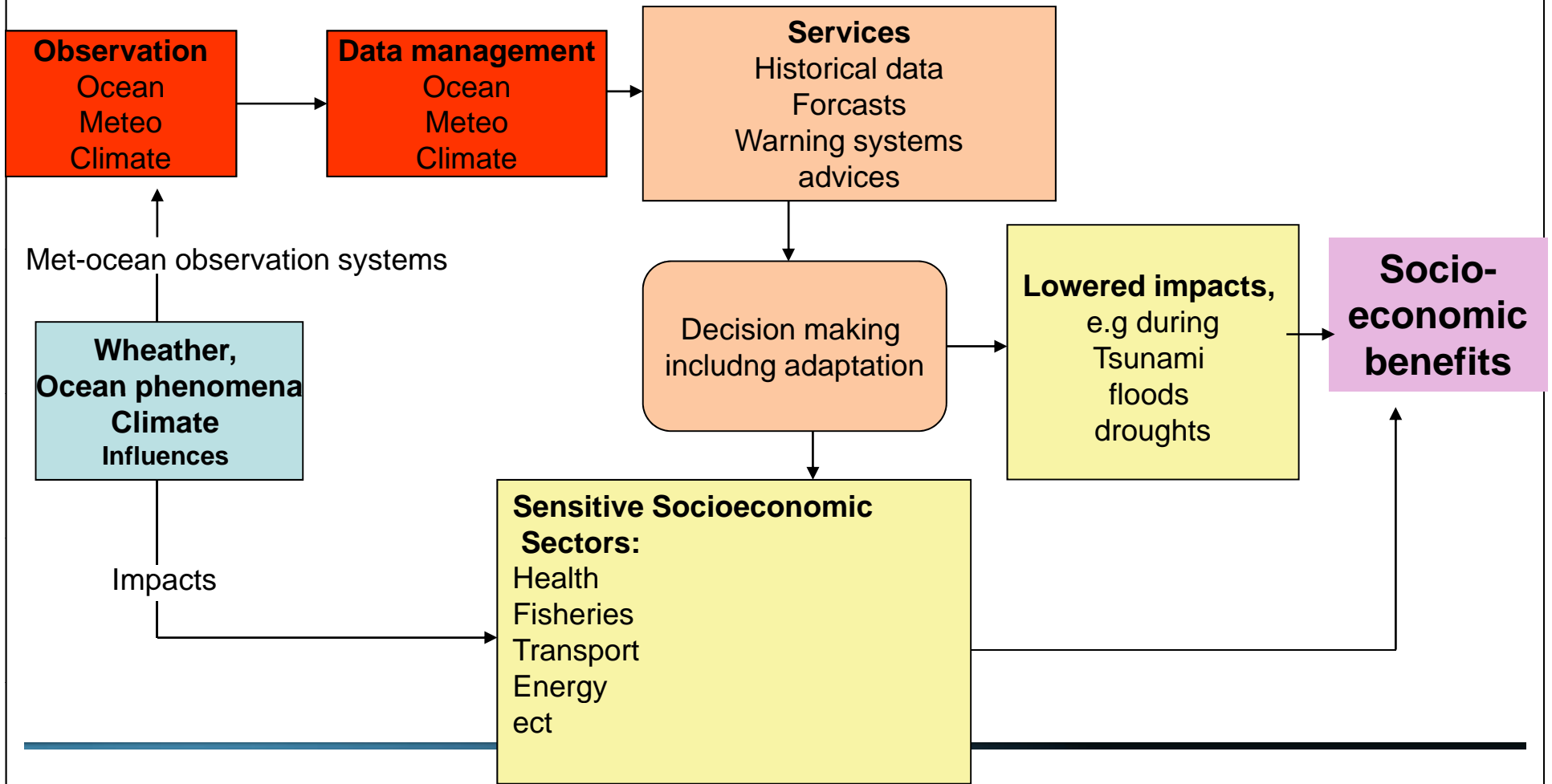
Maritime Safety



Oceanographic



Waves and surges





Societal benefit areas approved by GEOSS

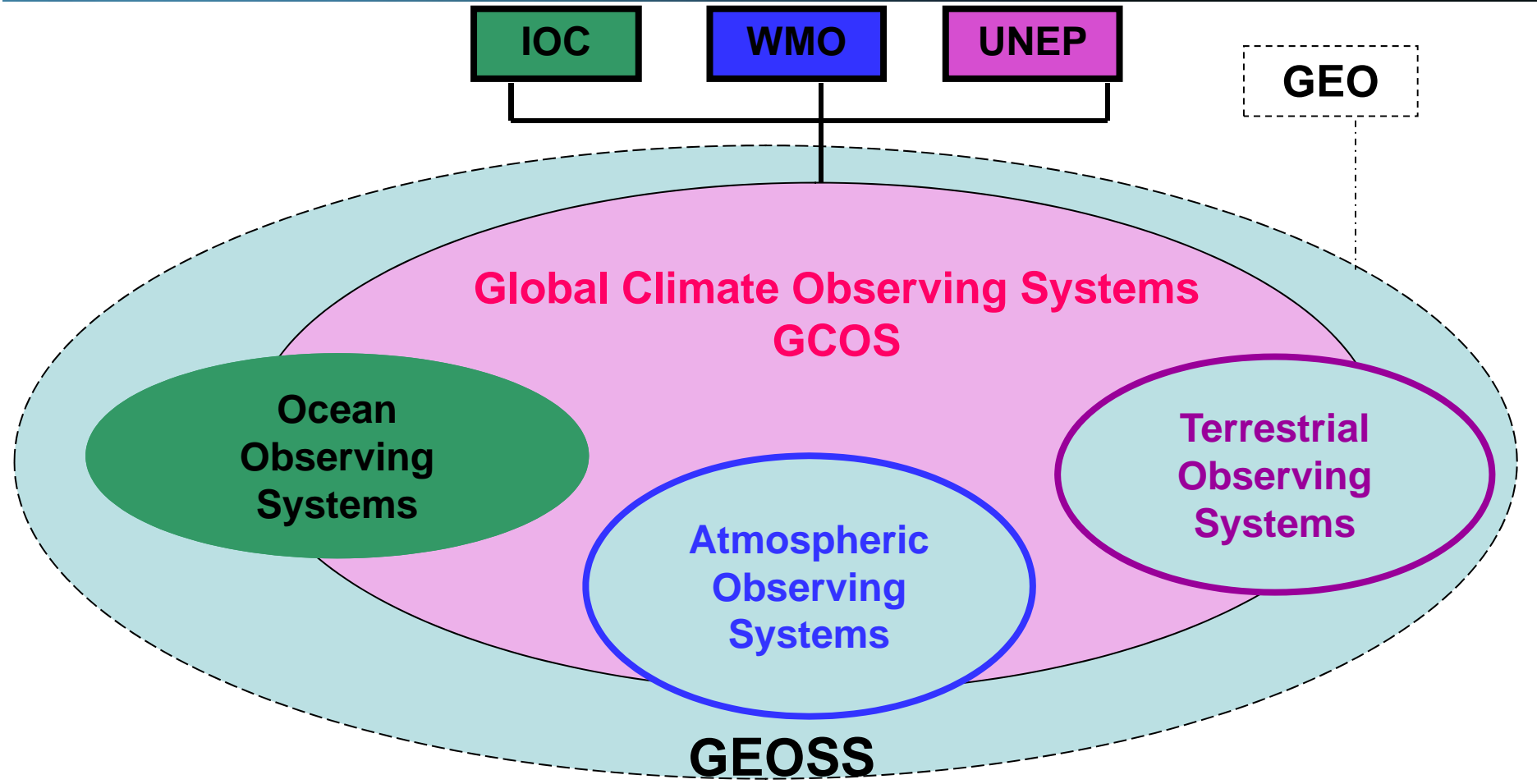
- Reducing loss of life and property from natural and human induced disasters;
- Understanding environmental factors affecting human health and well being;
- Improving management of energy resources;
- Understanding, assessing, predicting, mitigating and adapting to climate variability and change;
- Improving water resources management through better understanding of the water cycle;
- Improving weather information, forecasting and warning;
- Improving the management and protection of marine and coastal ecosystems;
- Understanding, monitoring and conserving biodiversity



The Future of Metocean data Observation

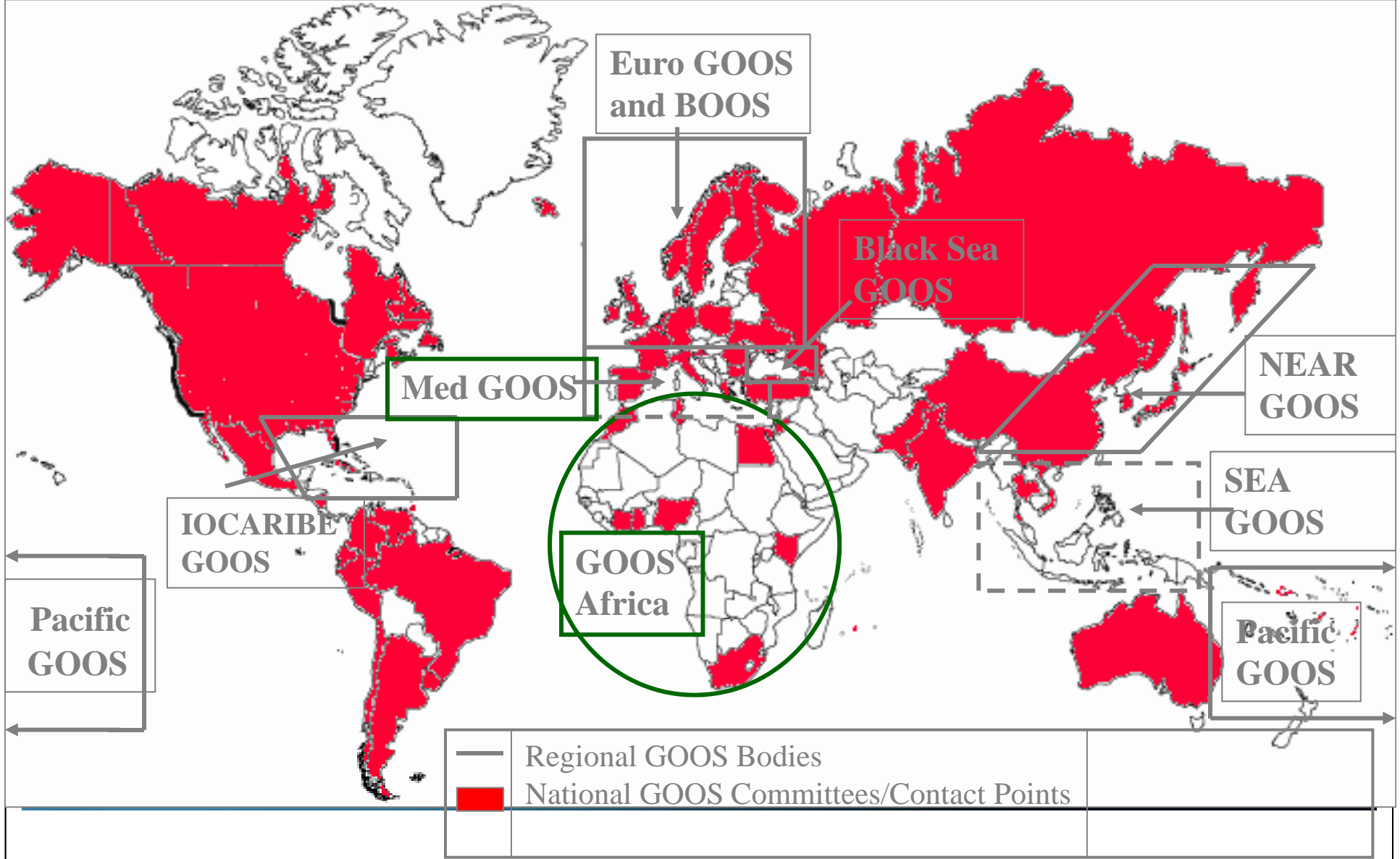


How does it function?





Global Distribution of Regional GOOS Bodies





Global Sea Level Observing System (GLOSS) for Africa



- Establishment of high quality global and regional sea level networks for application to climate, oceanographic and coastal sea level research
- It provides data for deriving the Global Level of the Sea Surface
- Main component is the 'Global Core Network' (GCN) of sea level stations

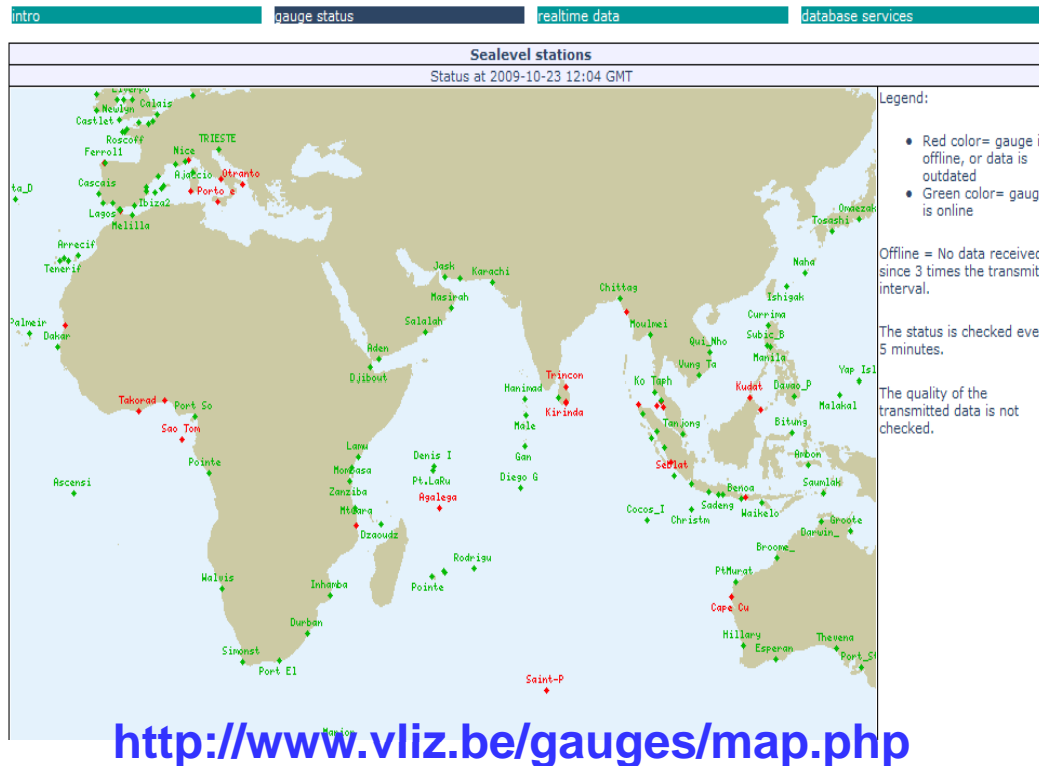




Sea Level Data Management

Tsunami Sea Level Station Monitoring Facility

The displayed data is raw realtime data, and should not be used for operational services.



- Monitor the operational status of sea level stations in African coastal areas and the Indian Ocean in real-time
- To provide a display service for quick inspection of the raw data stream from individual stations



Indian Ocean Tsunami Warning System

Oceans





Beyond the immediate response: Multi-hazard platform

- Storm – surges (IOC, WMO, JCOMM)
 - Tropical storms (WMO, JCOMM)
 - Improving Storm and cyclones track forecasts (IOC, WMO, JCOMM)
-



ARGO Programme

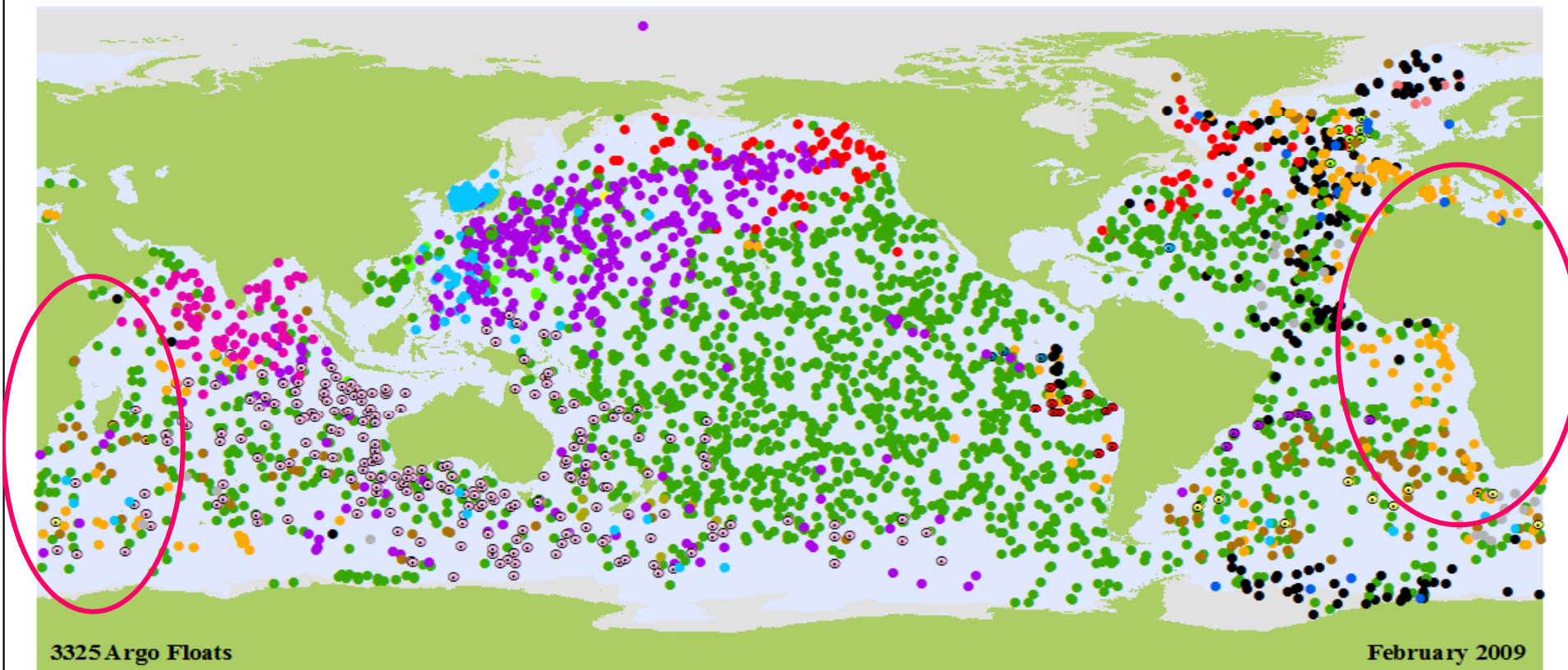
- Measuring temperature and salinity from the ocean surface down to 2000 m every ten days
- More than 3000 operational units reporting in real-time from the world oceans

Argo is now playing a key role in :

- improving the seasonal climate forecasts
- its data are routinely being used in coupled ocean-atmosphere models together with satellite products and other data from in-situ observing system



Argo in Africa



3325 Argo Floats

February 2009

- | | | | | | |
|-------------------|-----------------------|-----------------|---------------------|--------------------------|------------------------|
| ○ ARGENTINA (11) | ● CHILE (11) | ● FRANCE (161) | ● JAPAN (380) | ● NEW ZEALAND (9) | ● UNITED KINGDOM (107) |
| ○ AUSTRALIA (222) | ● CHINA (23) | ● GERMANY (189) | ● SOUTH KOREA (108) | ● NORWAY (5) | ● UNITED STATES (1852) |
| ● BRAZIL (7) | ● ECUADOR (3) | ● INDIA (76) | ● MAURITIUS (3) | ● RUSSIAN FEDERATION (1) | |
| ● CANADA (106) | ● EUROPEAN UNION (17) | ● IRELAND (8) | ● NETHERLANDS (25) | ● SPAIN (1) | |



Argo in Africa

- Few african countries participating to pogramme

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
ARGENTINA	0	0	0	0	0	0	0	0	0	12	0	0	0	12
AUSTRALIA	0	0	4	6	0	12	8	5	62	46	43	68	19	273
BRAZIL	0	0	0	0	0	0	0	0	4	0	4	0	4	12
CANADA	2	0	1	0	30	38	31	30	28	38	18	25	24	265
CHILE	0	0	0	0	0	0	0	0	4	4	0	4	0	12
CHINA	0	0	0	0	0	5	16	8	0	6	0	16	16	67
COSTA RICA	0	0	0	0	0	0	0	0	2	0	0	0	0	2
DENMARK	0	0	0	0	5	0	0	0	0	0	0	0	0	5
ECUADOR	0	0	0	0	0	0	0	0	0	0	3	0	0	3
EUROPEAN UNION	0	0	0	1	10	70	4	17	16	20	9	0	0	147
FRANCE	0	0	6	11	12	7	34	85	89	51	36	30	16	437
GABON	0	0	0	0	0	0	0	0	0	0	0	0	3	3
GERMANY	0	3	3	22	21	14	27	46	65	36	35	71	46	391
INDIA	0	0	0	0	0	11	23	30	45	15	31	15	7	177
IRELAND	0	0	0	0	0	0	2	0	0	0	0	4	4	10
JAPAN	1	12	12	6	40	76	129	118	107	116	102	92	60	871
KENYA	0	0	0	0	0	0	0	0	0	0	0	0	5	5
KOREA (REPUBLIC OF)	0	0	0	0	16	25	32	32	37	33	8	20	5	218
MAURITIUS	0	0	0	0	0	0	1	2	0	2	0	0	0	5
MEXICO	0	0	0	0	0	0	0	0	2	0	0	0	0	2
NETHERLANDS	0	0	0	0	0	0	0	3	4	4	4	13	4	32
NEW ZEALAND	0	0	0	0	2	2	0	2	1	3	2	2	2	16
NORWAY	0	0	0	0	0	3	6	0	0	2	0	0	0	11
RUSSIAN FEDERATION	0	0	1	0	0	2	0	2	0	0	0	0	2	7
SPAIN	0	0	0	0	0	0	7	2	1	1	0	0	0	11
UNITED KINGDOM	0	0	0	0	30	37	37	45	28	24	33	29	18	281
UNITED STATES	21	10	16	70	129	150	315	443	513	520	421	424	206	3238



Argo in Africa

- No statistics available about Argo data use by African scientists/projects
- Training workshops on Argo data use



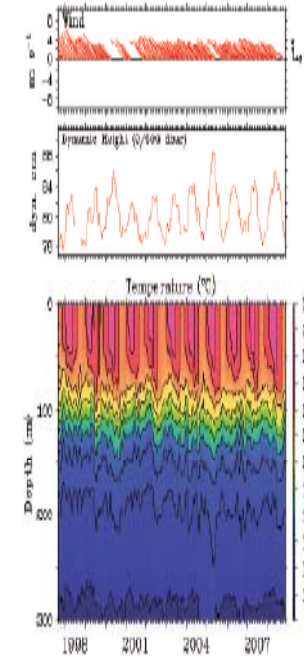
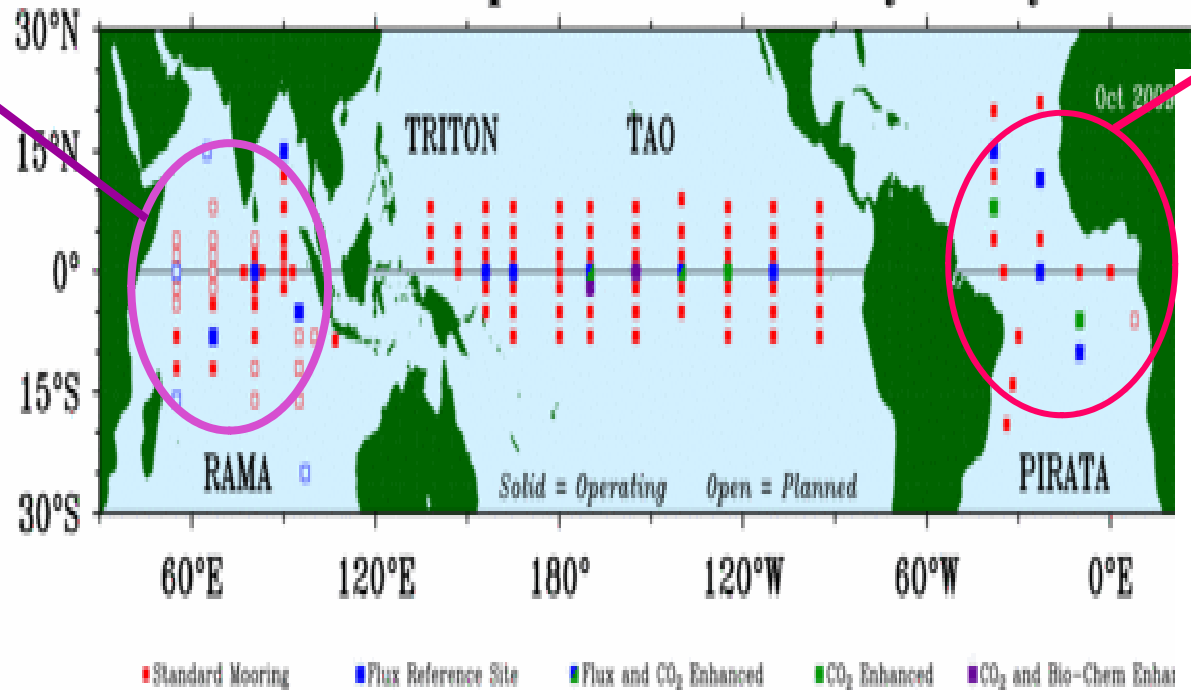


Global Tropical Moored Buoy Network: KEY TO UNDERSTANDING THE TROPICAL OCEANS

Global Tropical Moored Buoy Array

ASCLME

BCLME



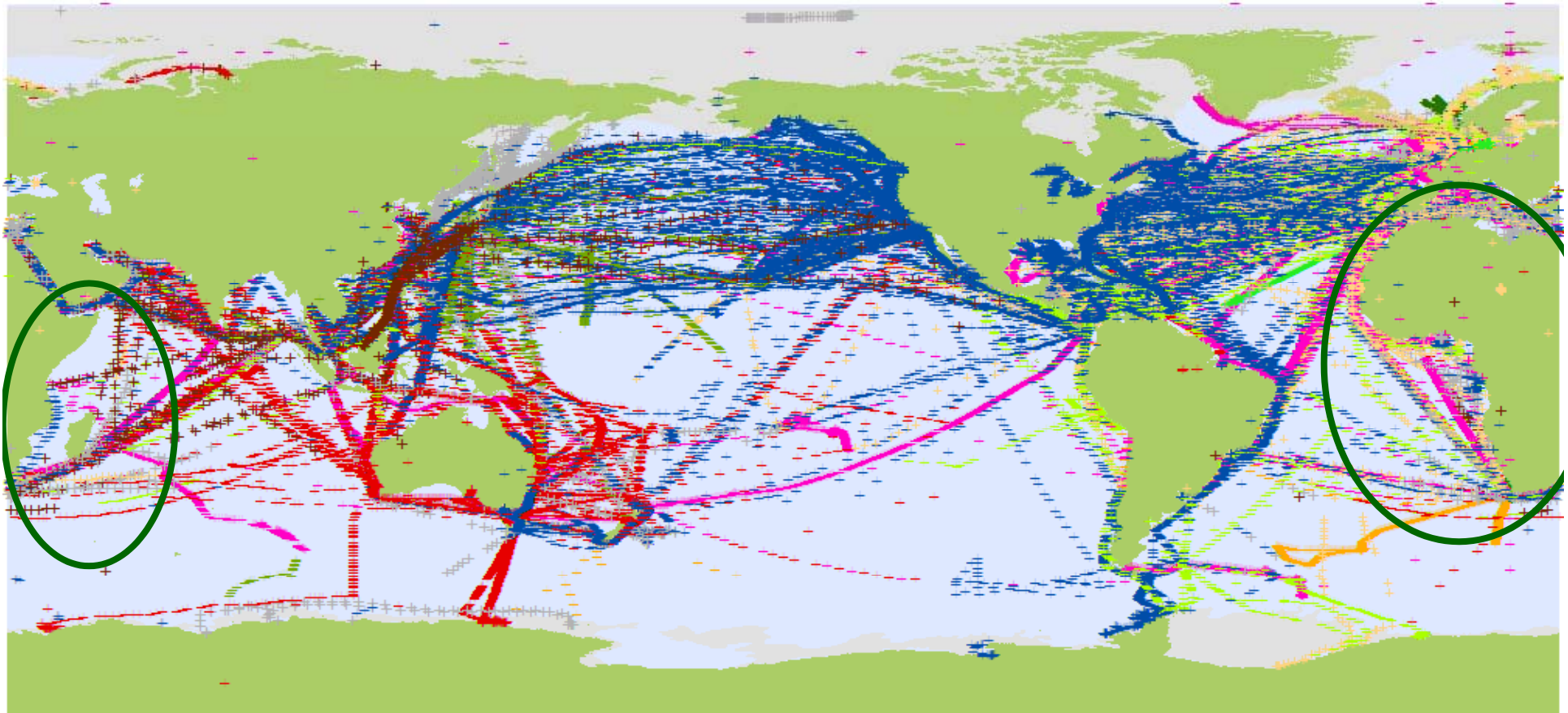
TAO Project Office, NOAA/P

IOC Project Office/WHOI/NOAA



Where are we now in Africa

- VOS observing meteorology (**map**)
- Vessels observing subsurface T&S



VOS (2309)
SHIP Reports (111846)

- | | | | | | | | |
|---|------------------|---|----------------|---|-----------------------|---|----------------|
| - | AMMC (Melbourne) | - | EGRR (Exeter) | - | EUMS (Darmstadt) | - | RJTD (Tokyo) |
| + | BIRK (Reykjavik) | + | EHDB (De Bilt) | - | KWBC (Wash'ton DC) | + | WSSS (Singap.) |
| - | EDZW (Offenbach) | + | ENMI (Oslo) | - | LFPW, LFWW (Toulouse) | + | Other |

January 2009



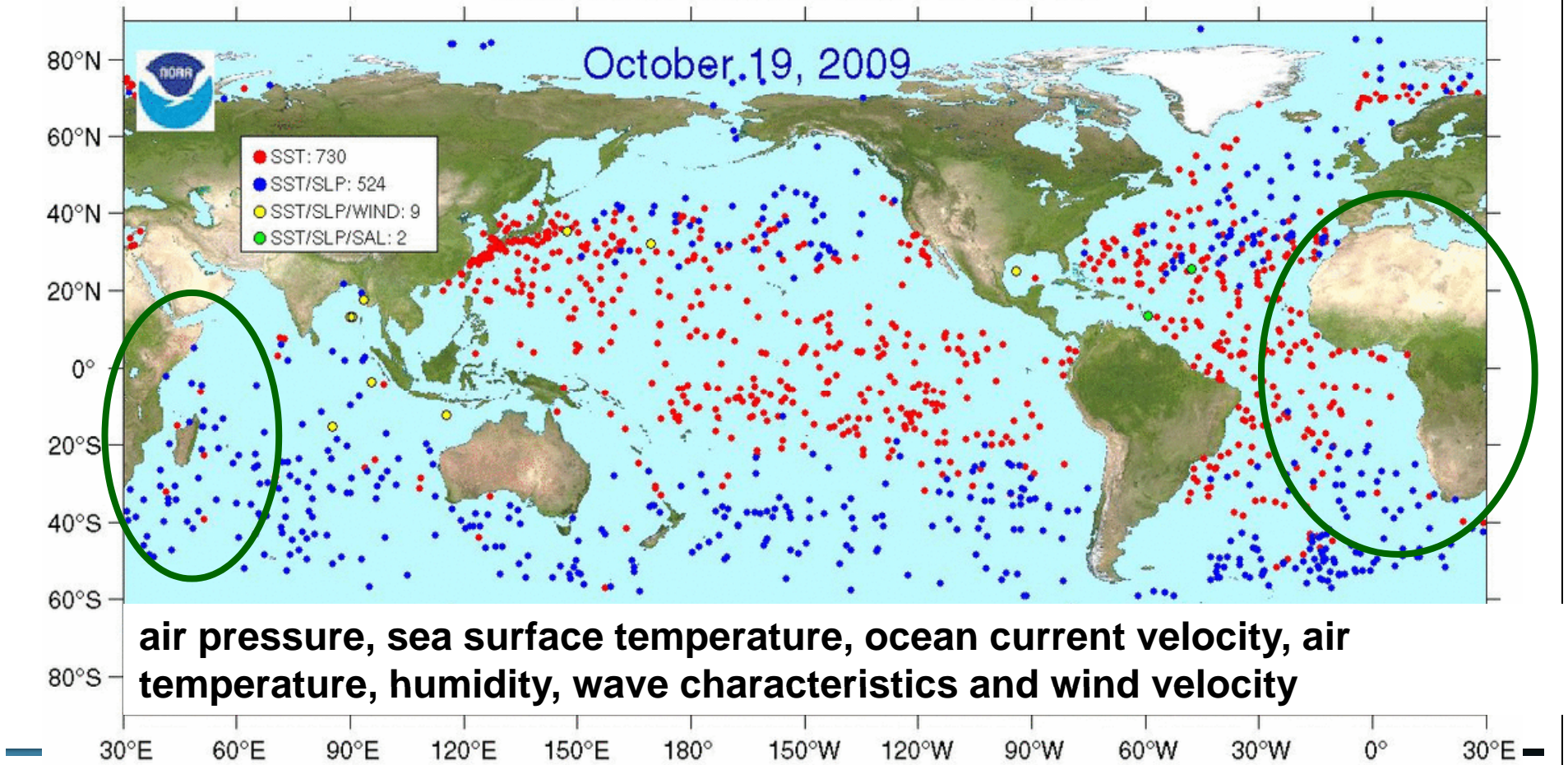


Where are we now in Africa

- VOS observing meteorology (map)
- vessels observing subsurface T&S
- drifters observing meteorology (map)



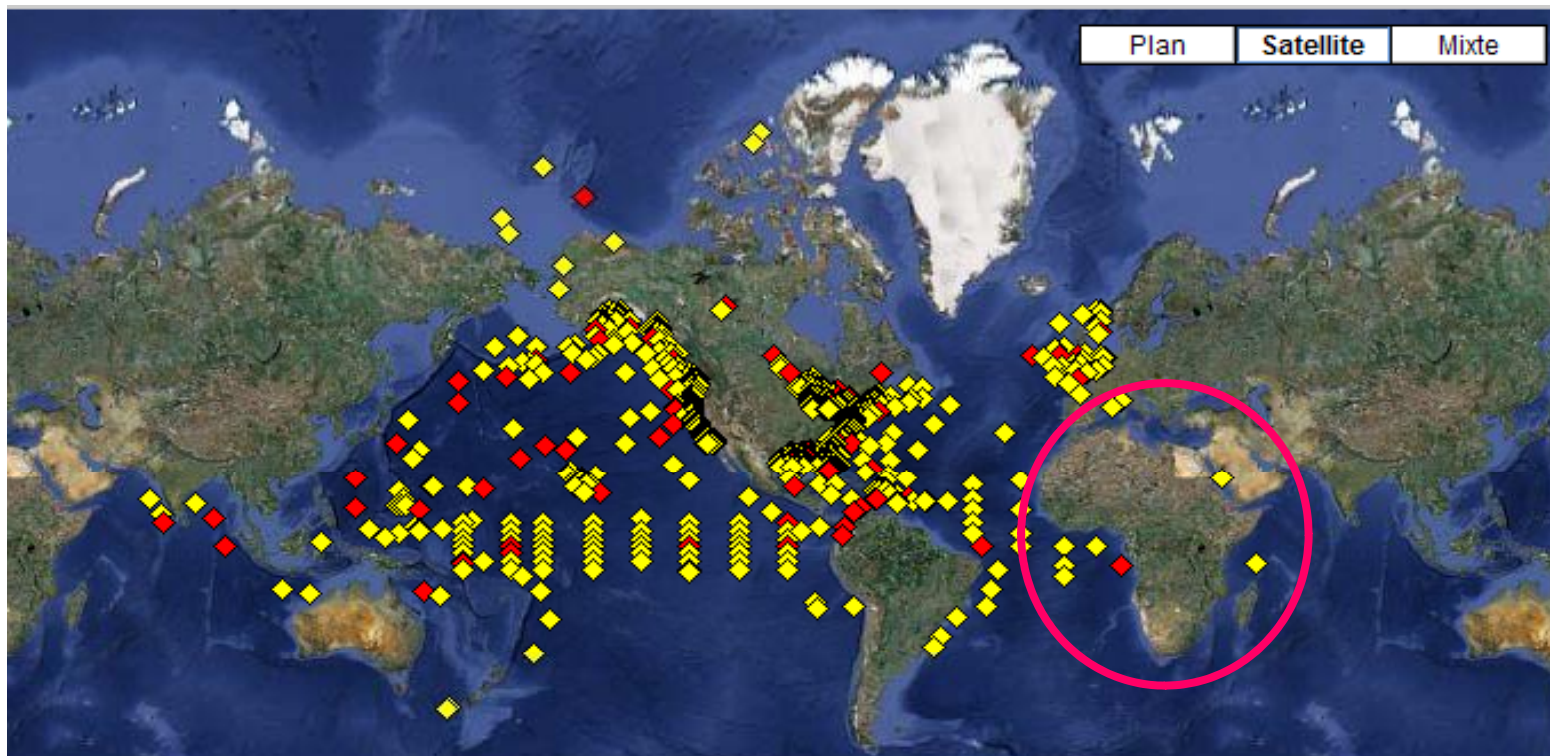
STATUS OF GLOBAL DRIFTER ARRAY





Where are we now in Africa

- VOS observing meteorology ([map](#))
- vessels observing subsurface T&S
- drifters observing meteorology ([map](#))
- Ocean buoys for met & ocean ([map](#))



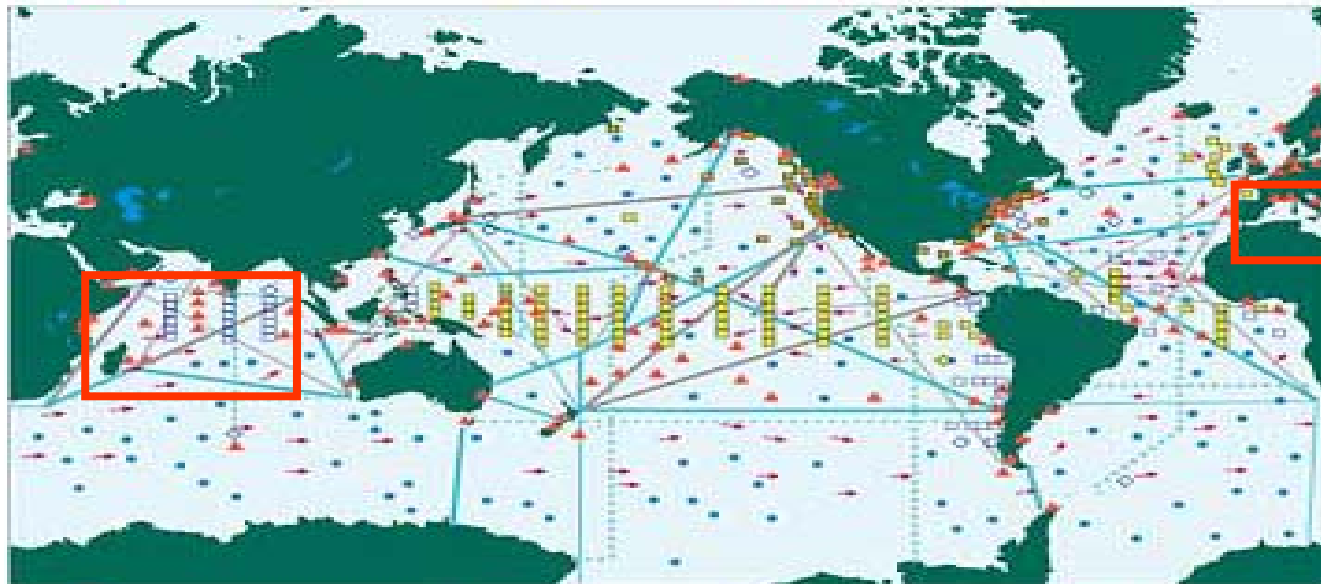
wind speed & direction, barometric pressure, air temperature, sea surface temperature, wave height and period, conductivity and water current



-
- VOS observing meteorology (map)
 - vessels observing subsurface T&S
 - drifters observing meteorology (map)
 - Ocean buoys for met & ocean (map)
 - 40 GLOSS
 - Argo (map)
 - Satellite
-



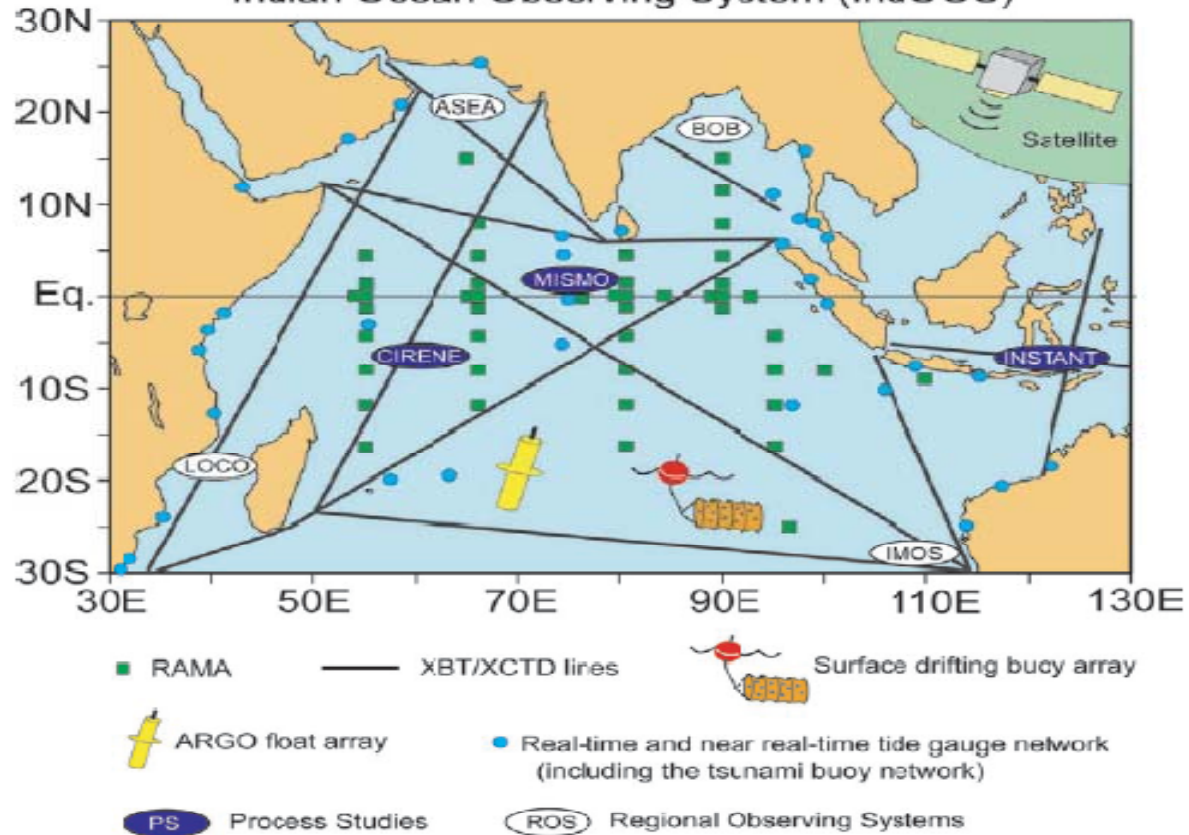
Global Ocean Observing System for Climate and Marine Services



30 x 30 ARGO ARRAY TIDE GAUGE STATIONS MOORED BUOYS 50 x 50 DRIFTER ARRAY SHIP LINES

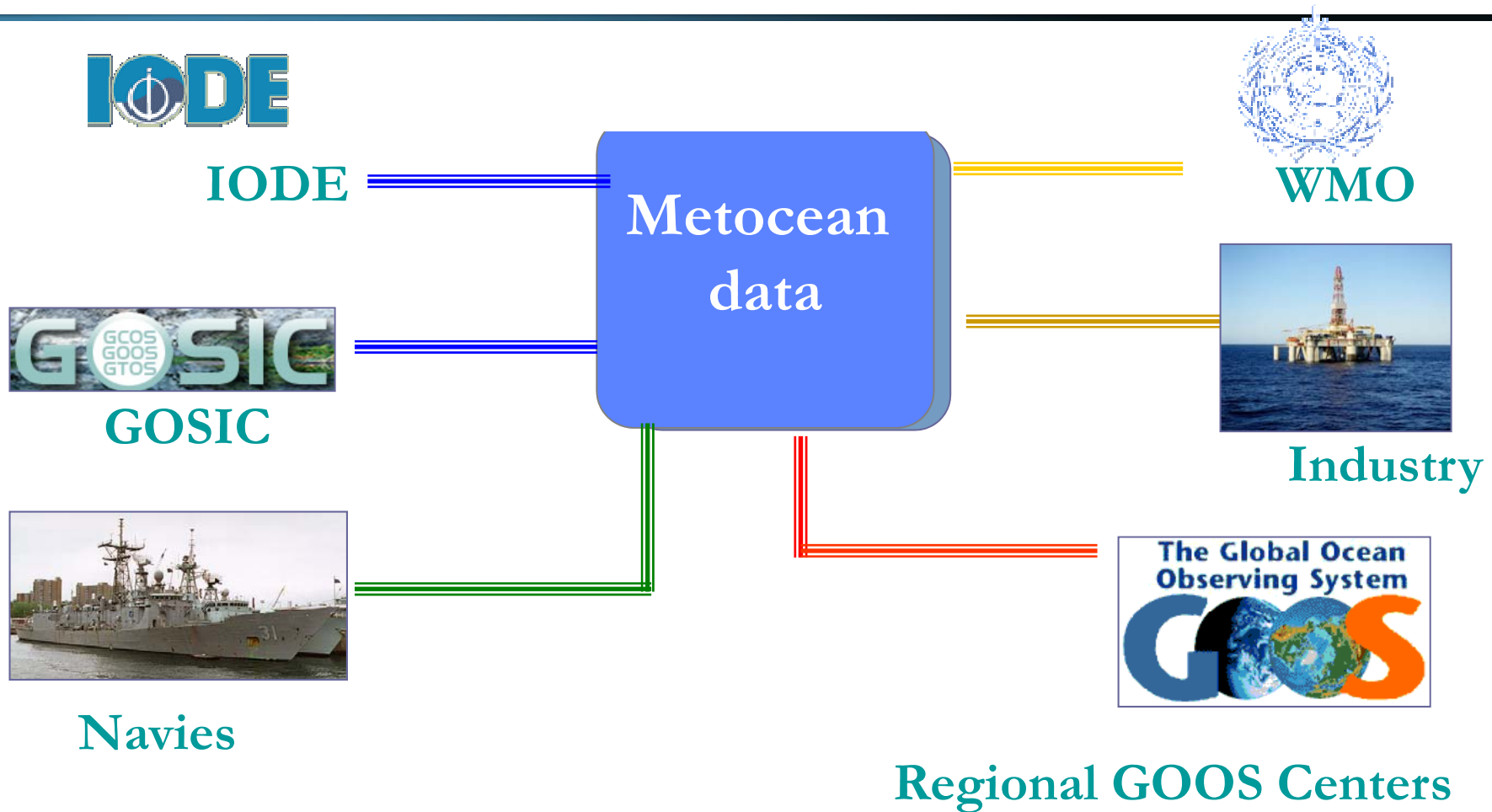


Indian Ocean Observing System (IndOOS)



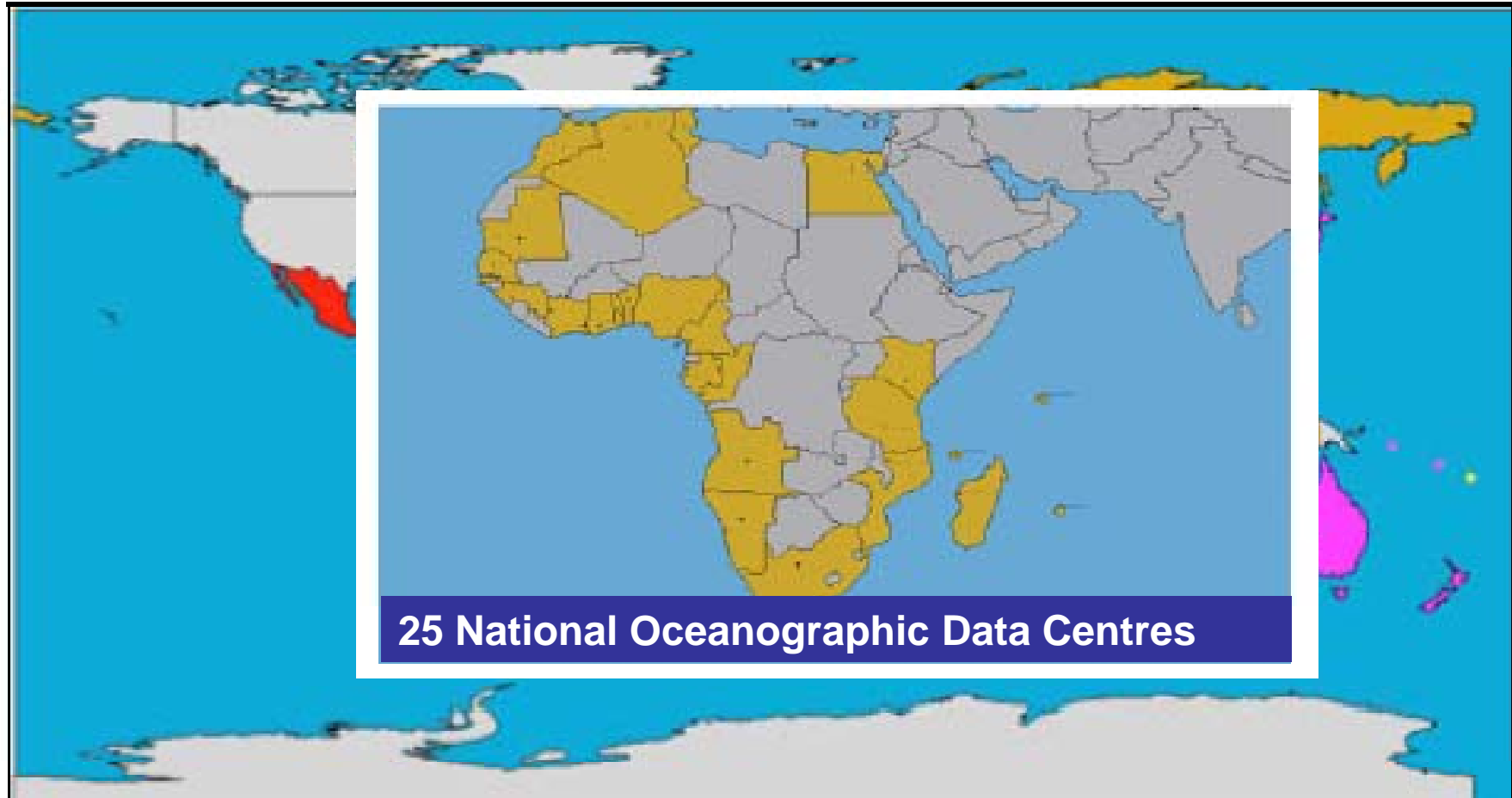


Integrated Data Management





IODE/ODINAFRICA: Ocean Data and Information Network for Africa





IODE/ODINAFRICA: Ocean Data and Information Network for Africa

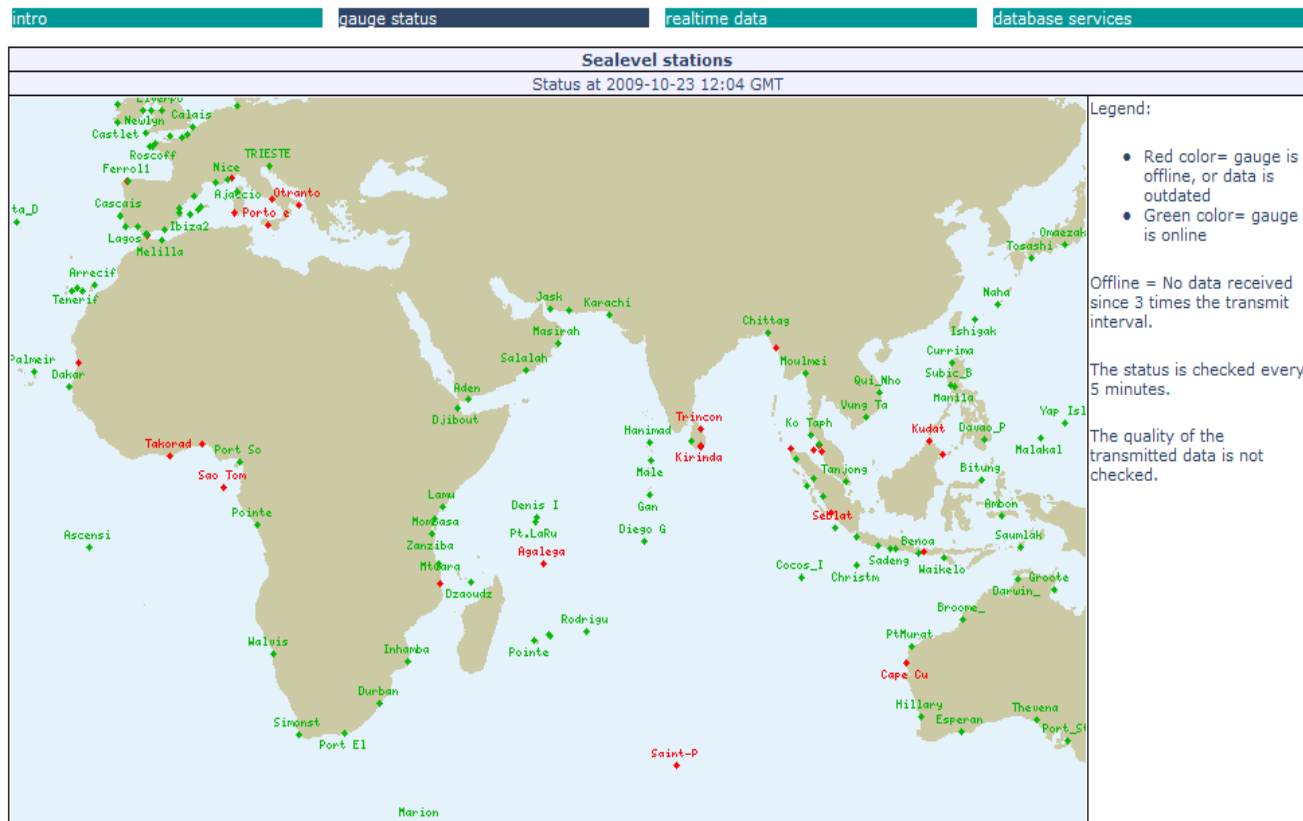
- 1. Providing assistance in the development and operation of National Oceanographic Data (and Information) Centres and establish their networking in Africa;
- 2. Providing training opportunities in marine data and information management applying standard formats and methodologies as defined by the IODE;
- 3. Assist in the development and maintenance of national, regional and Pan African marine metadata, information and data holding
- 4. Assist in the development and dissemination of marine and coastal data and information products responding to the needs of a wide variety of user groups using national and regional networks;



ODINAFRICA Sealevel facility

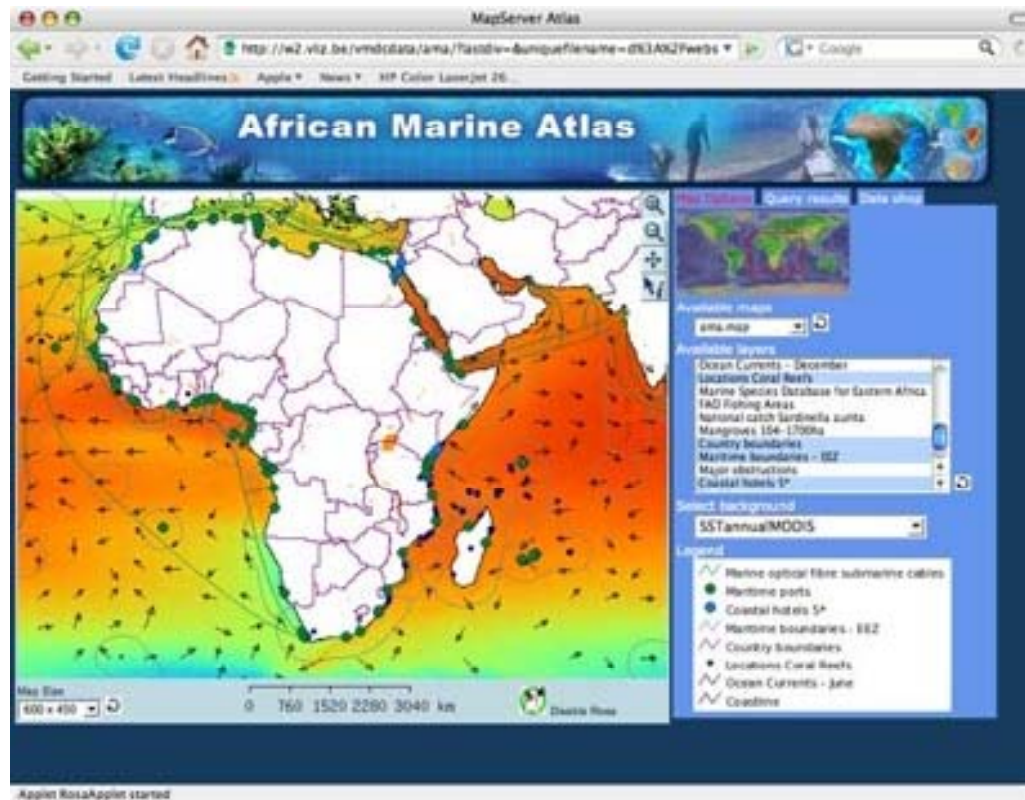
Tsunami Sea Level Station Monitoring Facility

The displayed data is raw realtime data, and should not be used for operational services.





African Marine Atlas



- identify, collect and organize available geospatial datasets
- 800 downloadable data products

Atlas Themes	Data Products
GEOSPHERE	19
HYDROSPHERE	445
ATMOSPHERE	96
BIOSPHERE	231
HUMAN ENVIRONMENT	27
BASE MAP	61



Ocean Data Portal: Concept

Keyword Find

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 Download and install [Java Runtime Environment](#) if map is not available

SEARCH OPTIONS
 Coordinates:
 Latitude max: 90.00
 Longitude min: -180.00
 Latitude min: -90.00
 Longitude max: 180.00
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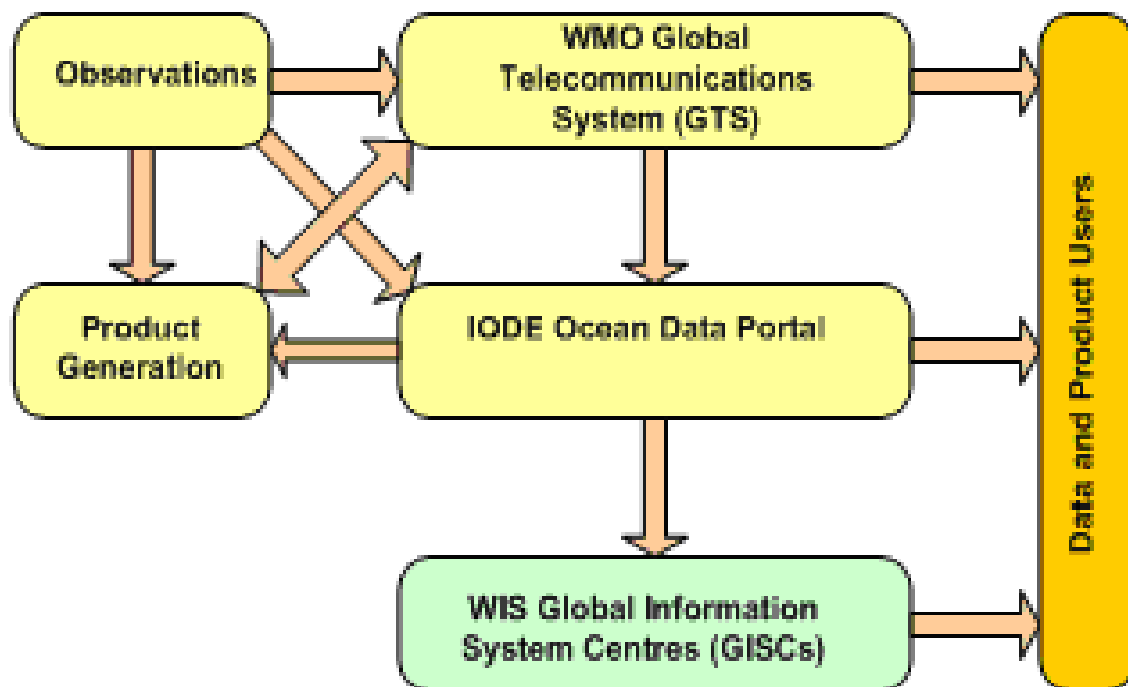
Geography (latitude,longitude)	Date and time	Provider
Upper-left corner: 90.00 -180.00	Start: yyyy/mm/dd hh:mi 1992 01 01 T 00 : 00	BGODC NODC of Russia
Lower-right corner: -90.00 180.00	Finish: yyyy/mm/dd hh:mi 2009 01 26 T 20 : 47	
Platform type	Processing level type	
Beach / intertidal zone	Observation data	
Fishing vessel	Summary-multy-year	
Research vessel		
Ship		

ODP provides on-line access to the distributed marine data: at operational and delayed mode time scales:

- of various processing levels (observation, climate, analysis and forecast);
- across oceanographic and marine meteorological disciplines;
- from multiple data source formats and storage systems and web-applications



Ocean Data Portal: interoperability

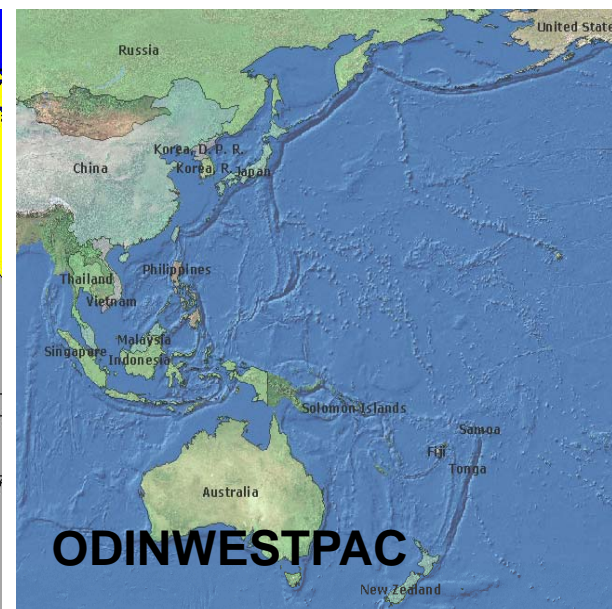


- ODP supports the data access requirements of all IOC programmes areas, including GOOS, HAB and the Tsunami warning system as well as JCOMM.
- ODP is interoperable with the WMO Information System (WIS) that will provide access to marine meteorological and oceanographic data and information



Ocean Data Portal: implementation

will be implemented on IODE ODIN concept and realization - ODINAFRICA, ODINWESTPAC, ODINBlackSea to provide integration of marine data and information from the ODIN regional network of the IODE Data Centres





IOC

WMO

UNEP

GEO

Global Climate Observing Systems
GCOS

Ocean
Observing
Systems

Atmospheric
Observing
Systems

Terrestrial
Observing
Systems

GEOS



Climate for Development in Africa (ClimDev Africa)



- An integrated, multipartner programme addressing
 - climate observations,
 - climate services,
 - climate risk management, and
 - climate policy needs in Africa
- Programme will support efforts to achieve the Millennium Development Goals
- Opportunity for substantial funding support for observations and climate service provision programmes of African NMHSs
- Principal partners are: African Union, African Development Bank, UN Economic Commission for Africa, WMO and GCOS
- Potential donors include UK Department for International Development, European Commission, African Development Bank



Parameters needed as defined by the Global Climate Observation Systems (GCOS)

Domain	Essential Climate Variables	
Atmo- spheric (over land, sea, and ice)	Surface:	Air temperature, Precipitation, Air pressure, Surface radiation budget, Wind speed and direction, Water vapor.
	Upper-air:	Earth radiation budget (including solar irradiance), Upper-air temperature, Wind speed and direction, Water vapour, Cloud properties.
	Composition:	Carbon dioxide, Methane, Ozone, Other long-lived greenhouse gases, Aerosol properties.
Oceanic	Surface:	Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea Ice, Current, Ocean colour (for biological activity), Carbon dioxide partial pressure.
	Sub-surface:	Temperature, Salinity, Current, Nutrients, Carbon, Ocean tracers, Phytoplankton.



Where are we going in Africa?

Status

- IOC/ IODE Capacity Building Strategy and Implementation Plans
- IOC/GOOS Capacity Building Strategy and Implementation Plans
- JCOMM Capacity Building Strategy
- Parallel efforts under other international programs, such as POGO

CB needs financial and institutional support

